FROM THE ANALYST'S COUCH

Biopharma deal-making in 2017

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Vintage sofa, Leudej Rodjanapaitoon/ Alamy Stock Photo

Drug makers in 2017 again faced many of the uncertainties and pressures experienced in 2016, including continued public and political criticism of drug pricing, and the urgency to put the patient and value-based health care at the forefront of medicine. Biotech companies — the typical source of assets in licensing deals for large pharmaceutical firms — also had more financing options in 2017, with a favourable market for initial public offerings and strong venture investor support, both of which may have presented some competition to deal-making. Nevertheless, big pharmaceutical deals were not deterred, especially when the scientific and commercial argument was strong.

The total value of mergers and acquisitions (M&As) in 2017 reached US$136 billion, according to Informa's Medtrack and Strategic Transactions, representing a 30% increase over 2016's $105 billion aggregate (*Nat. Rev. Drug Discov.* **16**, 161–162; 2017). The industries included in the value broadly cover biopharma, as well as consumer and over-the-counter (OTC) drugs, drug delivery technologies, contract research and manufacturing and clinical trial services, but exclude devices, diagnostics, research tools, insurance (for example, the $77 billion merger between CVS and Aetna is excluded) and animal health.

The volume of acquisitions gradually increased during 2017 from Q1 to Q3, reaching a high of 93 transactions, with a slowdown in the final quarter of the year (although the 80 deals in Q4 still beat the figures in Q1 and Q2). While the volume in general went up quarter-by-quarter, deal values were inversely proportional, gradually decreasing as 2017 progressed. Again, the only exception was Q4, when deal values actually jumped back up, including the largest number of billion-dollar transactions signed during a single quarter (FIG. 1a).

At $30 billion, Johnson & Johnson's acquisition of Actelion Pharmaceuticals was the largest M&A deal of 2017. It boosted the large pharma company's assets in cardiology with Actelion's pulmonary arterial hypertension franchise, which includes bosentan (Tracleer) and the anticipated blockbuster follow-on product macitentan (Opsumit). Under the transaction, Actelion spun off drug discovery operations and some early-stage candidates into a separate company called Idorsia, in which Johnson & Johnson took a 16% stake, as well as an option on the phase II drug ACT132577 for resistant hypertension that it exercised in late 2017. Another notable biopharma acquisition in a breakthrough year for cell and gene therapies was Gilead Sciences' $11.9 billion takeover of Kite Pharma, which gained FDA approval last year for one of the first two chimeric antigen receptor (CAR) T cell anticancer therapies, axicabtagene ciloleucel (Yescarta).

Major consolidation in the contract research organization industry featured in 2017, as companies combined various development capabilities and technologies with the aim of improving productivity in the pharma industry. INC Research and inVentiv Health merged under a $4.6 billion deal, while LabCorp acquired Chiltern for $1.2 billion. Parexel was taken private by Pamplona Capital Management, and research tools company Thermo Fisher Scientific entered the market with the $7.2 billion acquisition of Patheon.

Consumer health was another key theme among the biggest M&A transactions of 2017 (TABLE 1; Supplementary information S1 (figure)). Of the 18 billion-dollar deals done, 5 centred on the OTC market, together valued at just over $30 billion. Leading within that group was Reckitt Benckiser's $17.9 billion takeover of Mead Johnson Nutrition, known for its paediatric nutrition brands. Other large deals included Fresenius Kabi's $4.8 billion acquisition of Akorn and the private equity buy-out of Stada Arzneimittel for $4.4 billion. ▸

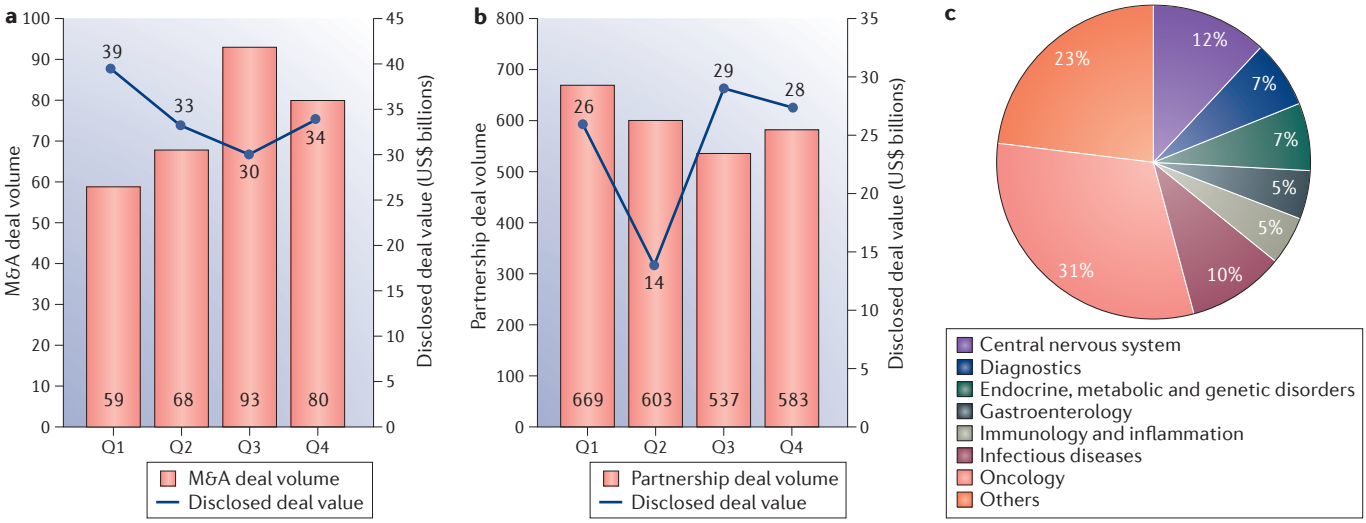

Figure 1 | **Biopharma deal-making in 2017. a** | Mergers and acquisitions (M&As). The chart includes full-company acquisitions and purchases of majority stakes. The total M&A deal volume includes deals that did not have a disclosed value. **b** | Partnerships. The total partnership deal volume includes deals that did not have a disclosed value. **c** | Breakdown of partnerships by therapeutic areas. Deals involving more than one therapy area may be counted multiple times, if applicable. Source: Medtrack; Strategic Transactions, Informa.

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Table 1 | **Top ten mergers and acquisitions of 2017**

Month	Acquirer(s)	Target	Deal value (US$ millions)
January	Johnson & Johnson	Actelion Pharmaceuticals	30,000
June	Reckitt Benckiser	Mead Johnson Nutrition	17,900
October	Gilead Sciences	Kite Pharma	11,900
October	Amneal Pharmaceuticals	Impax Laboratories	8,661[a]
August	Thermo Fisher Scientific	Patheon	7,200
February	Takeda Pharmaceutical	Ariad Pharmaceuticals	5,200
September	Pamplona Capital Management	Parexel International	5,000
April	Fresenius Kabi	Akorn	4,750
August	INC Research	inVentiv	4,600
April	Bain Capital and Cinven	Stada Arzneimittel	4,350

Source: Medtrack and Strategic Transactions, Informa. [a]Total enterprise value based on assumed share price of $19.95 for Impax per company presentation.

A review of partnership deals in Medtrack covering the same biopharma industries (but also including diagnostics and research tools companies) showed that 2017 was an active year for biopharma deal-making, with a total of 2,392 announced and completed partnerships (including licensing, product acquisition, commercialization, joint ventures, manufacturing/supply, options and R&D alliances), up 3% from the 2,314 deals in 2016 and continuing the brisk pace of the past few years (FIG. 1b). While deal volumes from quarter to quarter remained relatively stable, deal value fluctuated more. Q1, Q3 and Q4 had relatively even total deal values (around $27 billion), while total value in Q2 dipped to $13.7 billion. It is worth noting that while Q3 had the lowest deal volume at only 537 total disclosed deals, the corresponding total deal value in that quarter was the greatest at $29.1 billion. Several very large deals were responsible for this, as discussed below. The top ten partnership deals of 2017 (Supplementary information S2 (table)) had a combined value of $29.4 billion, representing nearly 31% of the total $96.1 billion in 2017, and up nearly 15% from 2016 (as compared with $25.5 billion for the top ten in 2016).

The top transactions continued to be in the immuno-oncology space, with deals focused on central nervous system (CNS), cardiovascular and gastrointestinal therapy areas also appearing in the top ten by disclosed total deal value. The top deal last year was the partnership between Merck & Co. and AstraZeneca for the oncology drug olaparib (Lynparza), with a potential value of $8.5 billion (including a $1.6 billion upfront payment) — one of the largest pharma partnerships on record by total potential deal value. Merck and AstraZeneca are exploring olaparib in combination with durvalumab (Imfinzi) and pembrolizumab (Keytruda) for a variety of oncology indications.

Another immuno-oncology transaction of particular note (although not in the top ten partnership deals of 2017) was the $1.4 billion deal between Chinese BeiGene and US-based Celgene. Specifically, Celgene licensed exclusive worldwide rights (including Japan but excluding other parts of Asia) to BeiGene's PD1 inhibitor BGBA317 in exchange for $263 million upfront, up to $980 million in back-loaded payments, as well as double-digit royalties on sales. Celgene also purchased $150 million in BeiGene ordinary shares as part of the agreement. On the flip side of the deal, BeiGene is acquiring Celgene's Chinese commercial operations and rights in China to key Celgene therapies.

While large pharma companies were the most common licensees among the mega-deals, Royalty Pharma, a rapidly growing private company that provides liquidity to royalty owners by acquiring revenue-producing intellectual property, was involved in the fourth largest deal of the year by total potential deal value. In the transaction, Perrigo licensed its royalty stream to multiple sclerosis drug natalizumab (Tysabri) in exchange for up to $2.9 billion in payments, including a front-loaded payment of $2.2 billion.

As seen in the mega-deals of 2015 and 2016, biobucks continue to represent the bulk of deal structures in 2017. Also, as in some of the 2016 deal structures, both equity stakes as part of upfront consideration and shared R&D expenditures are becoming more commonplace. Of the top ten partnerships in 2017, three had an equity component incorporated into the upfront payment, showing that licensers and licensees are becoming increasingly interconnected.

An analysis of all deals by therapy area revealed that, as in past years, oncology-related transactions continued to represent the greatest percentage of deal volume at 31% (559 total deals in 2017, up from 534 deals in 2016 and 463 deals in 2015), followed by CNS disorders at 12% (217 deals, up from 163 deals and 168 deals in 2016 and 2015, respectively; the number of CNS deals also eclipsed the number of infectious disease deals in 2017 for the first time in recent years), infectious diseases at 10% (183 deals in 2017; down from 195 deals in 2016 and 190 deals in 2015) and diagnostics at 7% (136 deals; a drop from 174 deals in 2016 and 216 deals in 2015) (FIG. 1c).

Continuing the trend of recent years, most deals in 2017 were signed at the research phase (also including deals for which the phase was undisclosed), followed by those in preclinical development and those with products already on the market. Average deal values including both upfront and announced milestones remained relatively high across the board. Q3 2017 average total deal values may appear to be a bit inflated due to the $8.5 billion olaparib partnership between Merck and AstraZeneca, which involved products at varying development phases (Supplementary information S3 (figure)).

Looking ahead to 2018 with the newly revised changes to the US corporate tax code, it will be worth watching to see what percentage, if any, of the realized tax savings US companies will use for in-licensing or acquisitions, and if these dominant US players will become even more dominant with the extra cash in their arsenal.

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Competing interests
The authors declare no competing interests.

SUPPLEMENTARY INFORMATION
See online article: S1 (figure) | S2 (table) | S3 (figure)
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